Fachhochschule Dortmund
University of Applied Sciences and Arts

WisPerMed
Wissens- und datenbasierte Personalisierung von Medizin am Point of Care

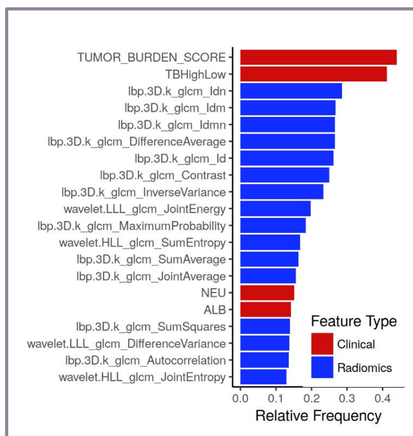
UNIVERSITÄT DUISBURG ESSEN
Offen im Denken

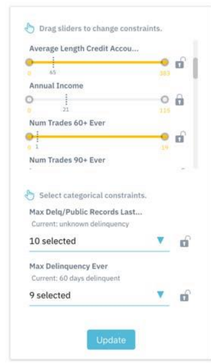
RP4 - Analysis of clinical image data including further clinical data - Explainable Radiomics

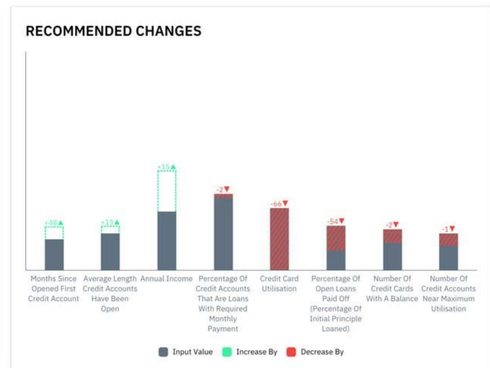
Research question

- Radiomics: great potential in oncological imaging
- Numerous derived image parameters and often further clinical data predictive machine learning models [1-3]
- DFG funded Radiomics project on melanoma response to immunotherapy at UK Essen (Radiology + Dermatology) [4]
- Unresolved problem: integration into the PoC and especially interpretability by clinicians [5].

State of the art







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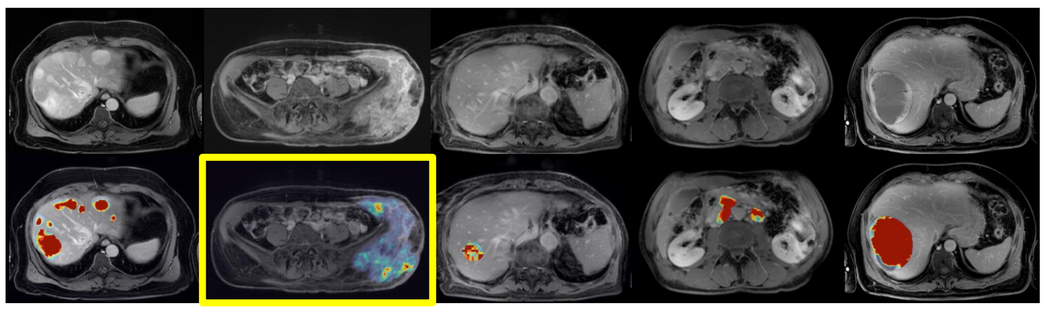
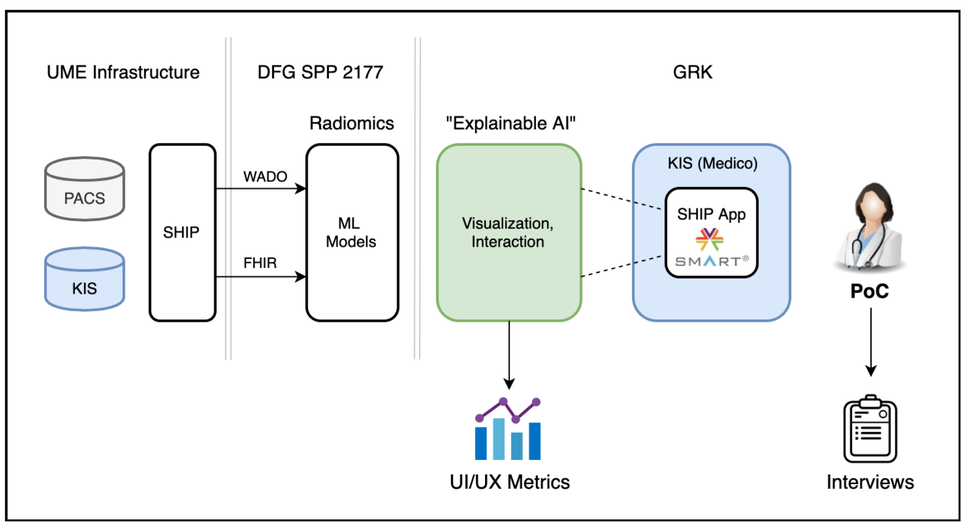


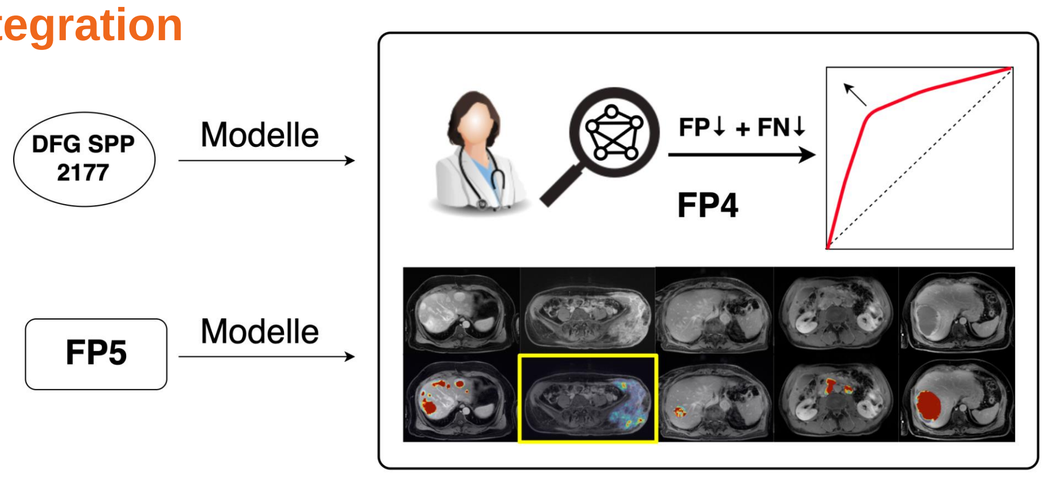
Fünf Patienten mit metastasiertem Melanom vor Einleitung einer ICB Therapie. Der zweite Patient (gelb) war ein Responder. Einfache Featurevisualisierung über Sliding Window (GLSZM Large Area Emphasis)

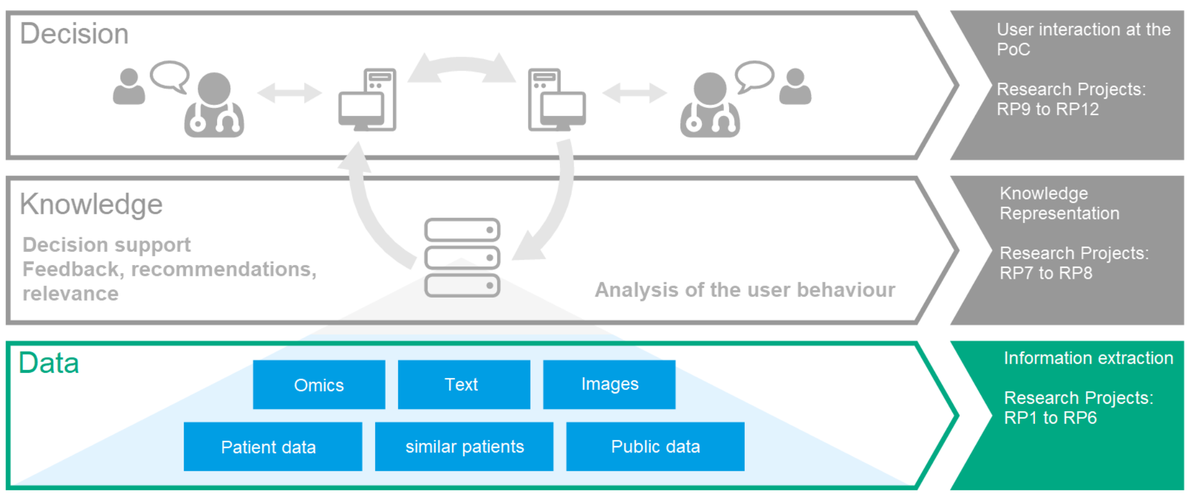
Solution approach

- Personnel and spatial connection to existing DFG project
- Based on the (intermediate) results (from [4]) development, implementation and evaluation of different methods from the field of "Explainable AI" at the PoC: Visualization (features, segmentations), Explainability summary reports, Layer-wise Relevance Propagation (LRP), Activation Maps, Counterfactual explanations, Stacked models
- *Evaluation at PoC: Accuracy, UI/UX Analytics, User Acceptance Testing, User Trust (collaboration with Prof. Krämer)*



Integration





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